



## Director's Matters

To mark the 50th anniversary of the invention of the laser, several scientific societies have joined together to promote [LaserFest](#), a yearlong celebration of how this valuable [tool for science has transformed our lives](#)—from applications in manufacturing and medicine, to communication and scientific research. OSA, APS, SPIE, and IEEE Photonics Society, with dozens of additional partners including AIP and several other Member Societies, will be sponsoring LaserFest activities throughout the year. For starters, I've asked Greg Good of AIP's History Center to offer some insights on the history of this important invention. Enjoy! —Fred



## Rubies and lasers in the summer of 1960

*Guest column by Greg Good, director, AIP Center for History of Physics*

Scientific discovery and technological invention have long been intertwined. Such developments as the laser usually emerge from the frenzied, highly interactive, complicated, and competitive work of many individuals—in the case of the laser, shifting teams of individuals. Several characteristic institutions of modern science were involved: industrial research labs, university science departments, science conferences, and the courts and patent system.

A critical element was the "research teams," with each team focused on one or another important part of a very complicated set of interlocking problems—technical, potentially profitable, likely worthy of a Nobel Prize. The stakes were high.

Historians of science see great value in teasing apart the intricate human interactions that produce such undeniably important developments as the laser—a device now ubiquitous in entertainment, national security, and industry. Historians shrink, however, at oversimplification. Which development was the single crucial one? Who was the

least, this is the historian's inclination. How did all these individuals interact? How did these fragmented activities coalesce into devices and knowledge that have changed our world?



Theodore Maiman (left) looks on as William Weigl, president of the National Inventors Hall of Fame Foundation, unveils a display honoring him at ceremonies in Washington, DC. The display includes a replica Maiman's laser and is on permanent exhibit in the lobby of the U.S. Patent and Trademark Office, Arlington, VA.

Credit: AIP Emilio Segre Visual Archives, *Physics Today* Collection

On July 8, 1960, the [\*New York Times\*](#) proclaimed on the front page: "Light Amplification Claimed by Scientist." Theodore Maiman, working for Hughes Research Laboratories in California, had produced a laser—so a press conference had announced, although no refereed scientific publication backed up the announcement.

It was not that simple, however. In 1958, Charles Townes and Arthur Schawlow, at Columbia University and Bell Labs on the East Coast, had published a seminal paper suggesting how a laser could be built. During 1959, more researchers pursued parts of the puzzle: at Columbia, Gordon Gould, William Bennett, and Donald Herriott, along with Wolfgang Kaiser and Geoffrey Garrett, pushed experimental limits.

Gould coined the term "laser" (from Light Amplification by Stimulated Emission of Radiation) in a 1959 conference paper. Others tackled the engineering difficulties and the physics challenges. Albert Clogston and his Bell Labs investigators took the Hughes Lab press conference as a challenge. Donald Nelson got the go-ahead and launched a crash lab program to make a ruby laser. It's a classic story of technical knowledge, failed attempts, and ultimate success. That part of the laser story required both teamwork and competition. It required theoretical acumen and technical ingenuity. Ambiguity haunted the results. Problems ultimately were overcome.

As the saying goes, the rest is history. But history is messy, never simple. And its lessons are subtle. To reach your own conclusions, read the article "[Bell Labs and the Ruby Laser](#)" in the January 2010 issue of [\*Physics Today\*](#) (page 40); a new web exhibit at the Center for History of Physics will be unveiled shortly.

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